

# VC 630/5AX



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**Simultaneous  
5-axis Vertical  
Machining Center**

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**VC 630/5AX**  
VC 630/5AX  
VC 630/5AX with APC

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Basic Information

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Cutting  
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# VC 630/5AX

The VC630 5AX machining center provides full 5 axis simultaneous machining capability. It's highly rigid integral rotary/tilt table and high precision built in spindle provide the solution for both high speed and heavy duty machining of complex parts in one setting.



The highly rigid machine designed by FEM simulation techniques, and responsive axis feed system provide world class precision machining capability.

The high precision and high performance ensures optimum machining performance at high speed and heavy duty cutting.

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### Higher Machining Accuracy

For higher accuracy, we provide the thermal displacement compensation system even during a prolonged period of machining and high-rigidity machine structure.

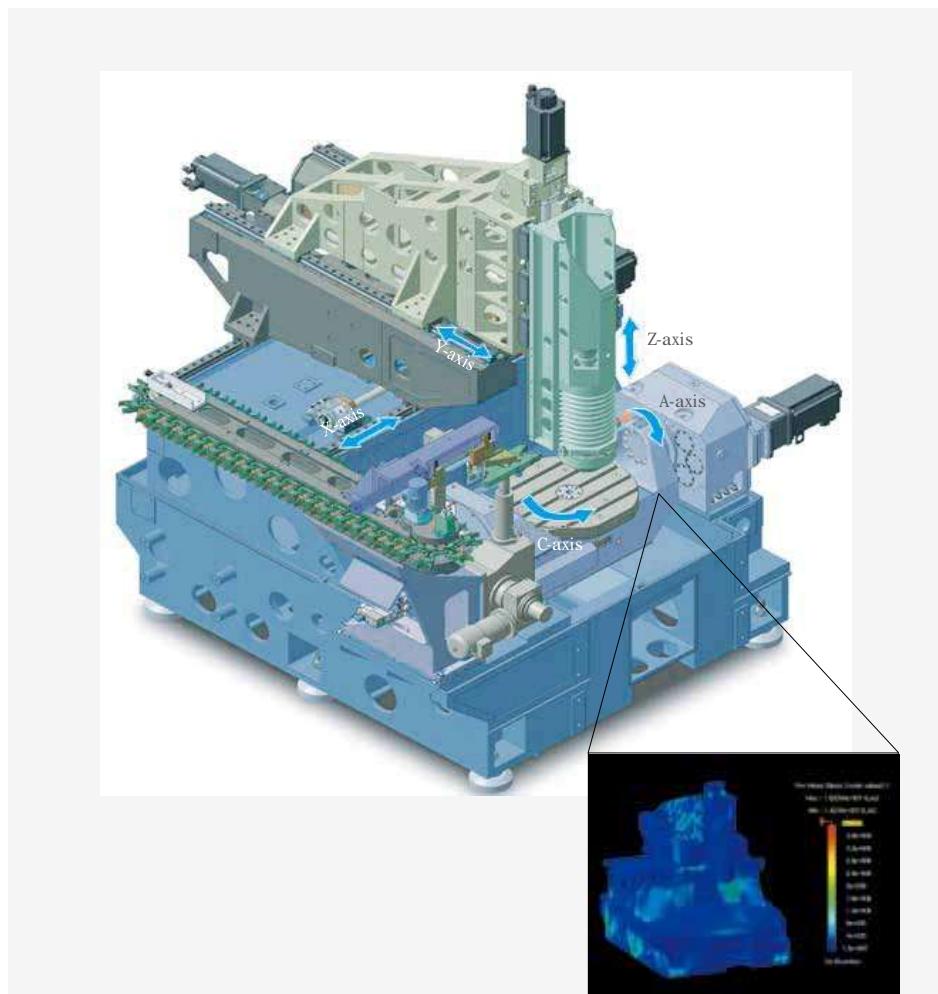


## Basic Structure

High rigidity machine structure results in optimum static and dynamic rigidity verified by 3D simulation, resulting in highly stable precision machining.

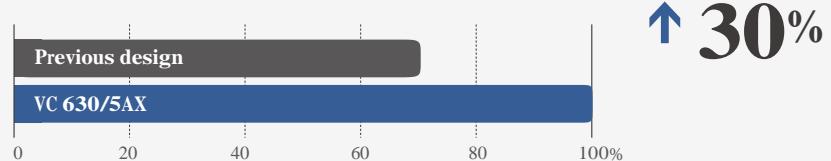
### High-Rigidity Design and Structure

Machine structure is designed by Finite Element Analysis Method (FEM) and the static/dynamic rigidity is further enhanced.



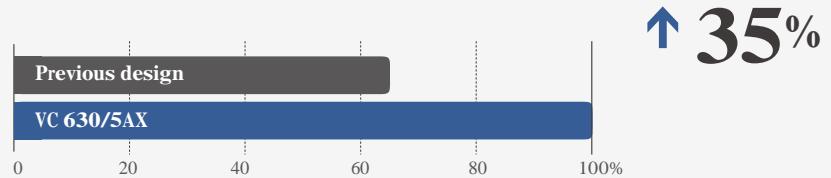
#### Static Rigidity

The static rigidity structure of the VC630/5AX has been increased by 30% through the FEM analysis.



#### Dynamic Rigidity

FEM analysis was also used to improve the frequency response and vibration damping property by 35% over the previous design.

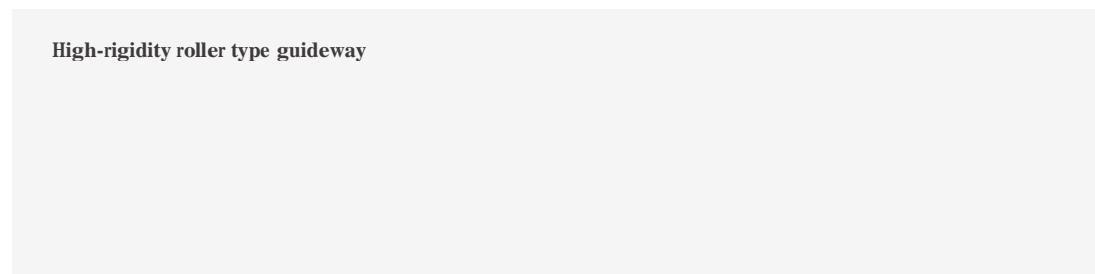




## Axis Feed System

### High-Rigidity Axis Feed System

The axis feed system structure is designed to achieve the combination of high rigidity and responsive feed motion. the base casting is made of heavy duty Meehanite Cast Iron which provides excellent vibration damping characteristics and guarantees highly stable machining conditions. Roller type linear guideways and highly rigid couplings are included to provide both rigidity and sensitive X,Y,Z axis feed. Ballscrew nut cooling reduces heat generation to minimise thermal displacement

<p><b>High-rigidity roller type guideway</b></p>  <p>proved with roller type guideway and coupling.</p>																
<p>Ball screw nut cooling</p>																
<p><b>VC 630/5AX</b></p> <table border="1"> <thead> <tr> <th>Division</th><th>Unit</th><th>X-axis</th><th>Y-axis</th><th>Z-axis</th></tr> </thead> <tbody> <tr> <td>Travels</td><td>mm (inch)</td><td>650 (25.6)</td><td>765 (30.1)</td><td>520 (20.5)</td></tr> <tr> <td>Rapid travers</td><td>m/min (ipm)</td><td>40 (1574.8)</td><td>40 (1574.8)</td><td>36 (1417.3)</td></tr> </tbody> </table>		Division	Unit	X-axis	Y-axis	Z-axis	Travels	mm (inch)	650 (25.6)	765 (30.1)	520 (20.5)	Rapid travers	m/min (ipm)	40 (1574.8)	40 (1574.8)	36 (1417.3)
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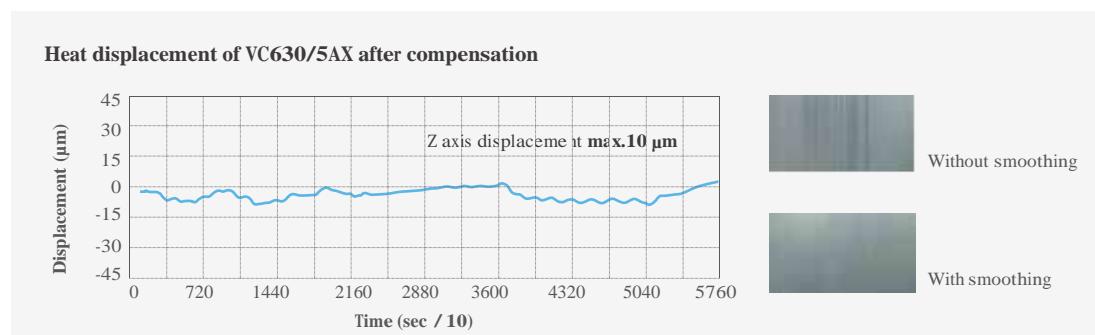
### Linear scale option

All axes are equipped with the linear scale as a optional feature to maintain thehighest degree of accuracy over many hours of operation.



### Thermal Error Compensation

live data is collected from multiple temperature sensors around the machine are combined with Doosan feed system smoothing algorithms to provide real time thermal compensation and provide optimum precision.





## Rotary Table

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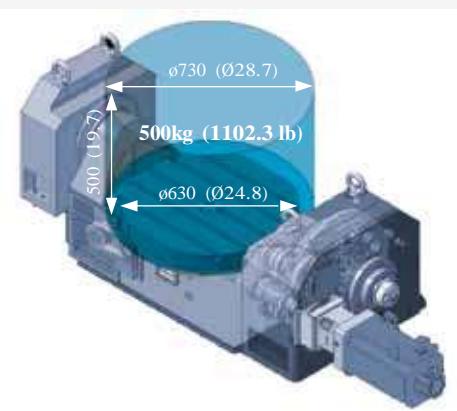
Service

Large workpiece capacity allows a variety of parts to be machined in one set up.

## Max. Workpiece Size and Weight

### Max. size

**Ø730 x 500mm  
(Ø28.7 x 19.7 inch)**



### Max. weight

**500kg  
(1102.3 lb)**

## Wider Machining Area

A wide machining area allows access to machine many features of large workpieces.

Y stroke 765 (30.1)  
450 (17.7) 315 (12.4)

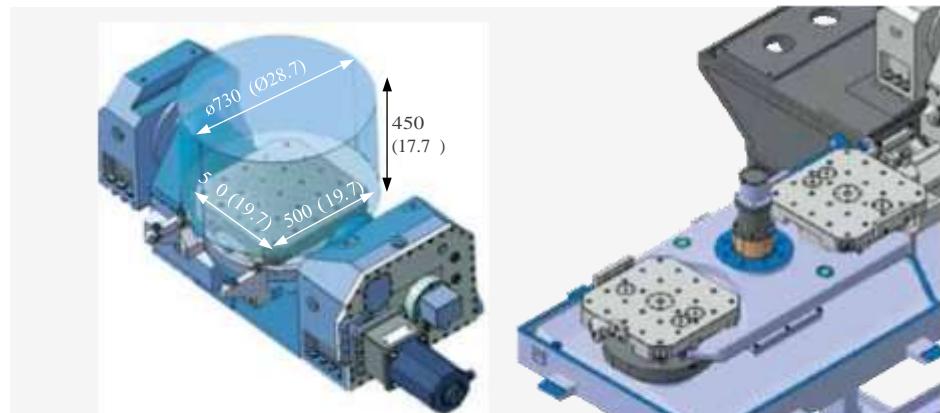
### Stroke

Division		A-axis	C-axis
VC 630/5AX	Travels (deg)	+30 ~ -120	360
	Rapid traverse (r/min)	20	30

50 (1.97)  
Max. Workpiece 500 (19.7)

## Automatic Pallet Changer (APC) option

The automatic pallet changer allows setting the workpiece even during the machining process to further improve productivity.



Pallet size	500 x 500 mm (19.7 x
Max. workpiece swing (D x H)	Ø 730 x 450 mm (Ø28.7
Table loading capacity	500 kg (1102.3 lb)
APC Change time	30 s



## Tool Changer

Along with the rapid tool change that enables higher productivity, a wide range of choices is available for tool magazines.

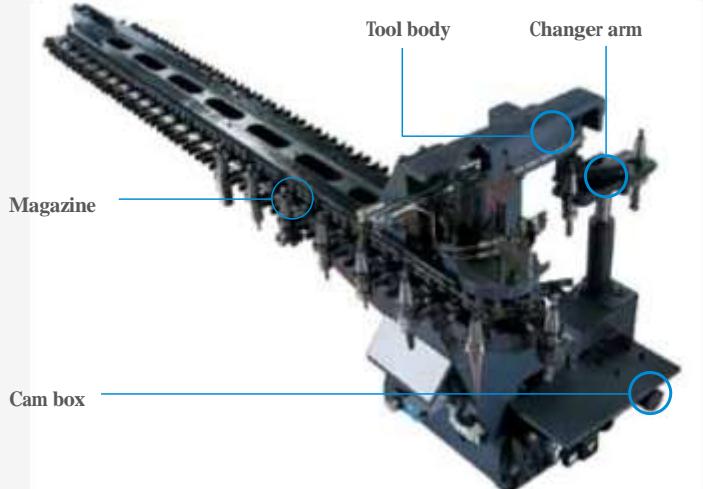
### Automatic Tool Changer

Tool change time

40 tools CAM Type ATC

(60, 81, 101, 121 tool) option

**1.0s**



### High-Capacity Magazines option

A wide range of tool magazine choices (60 / 81 / 101 / 121 tools magazines) is available. The Increased tool capacity will improve user convenience and efficiency.

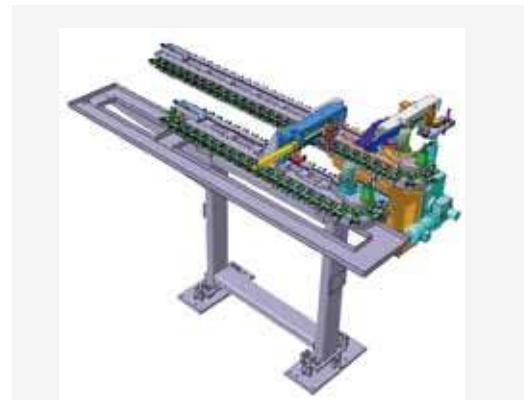
60 Tools



81 Tools



101 Tools



121 Tools





## Spindle

Built-in motor  
minimizes vibration  
and noise generated.

### Built-in Spindle

The main spindle is optimally designed with 4 row precision ceramic bearing whose features, low centrifugal force and minimum heat generation, are great merits at high speed condition. The high productivity is realized by reduction of the acceleration time to the maximum speed of main spindle.



### Spindle Motor

Spindle Motor Power Output (30min/cont. : 12000 r/min)

FANUC

**22/18.5 kW**  
(29.5/24.8 Hp)

HEIDENHAIN

**23.5/18 kW**  
(31.5/24.2 Hp)

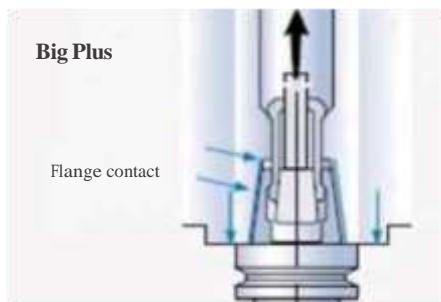
SIEMENS

**30/24 kW**  
(40.3/32.2 Hp)



### Dual Contact Spindle

Dual contact spindle is adopted to improve spindle life and surface roughness in high-speed cutting process.





## Cutting Performance

From high-speed machining to heavy-duty cutting, diverse machining processes are applicable for complex-shaped workpiece.

### Machining Performance

#### Max. chip throughput

Item	Material		Condition (SM45C, AL6061 same)
	SM45C	AL6061	
Machining removal rate	739.2 cm <sup>3</sup> /min	2688 cm <sup>3</sup> /min	
Feed rate	3300 mm/min (130 ipm)	7000 mm/min (275.8 ipm)	
Depth	2.5 mm (0.1 inch)	2.5 mm (0.1 inch)	
Width	64 mm (2.5 inch)	64 mm (2.5 inch)	

#### Max. / min. tapping capabilities

Item	Material	
	SM45C	AL6061
Tool size	M42 x P4.5	M3 x P0.5
Feed rate	675 mm/min (26.6 ipm)	1800 mm/min (70.9 ipm)

\*The results, indicated in this catalogue are provided as example. They may not be obtained due to differences in cutting conditions and environmental conditions during measurement.

### Machining Examples

#### Tire Mold

Workpiece size	400 x 400 x 150 mm (15.7 x 15.7 x 5.9 inch)	
Material	Wood plastic	
Mold Package	332 Tuning Cycle (Heidenhain Itnc530)	
Cutting	Finish	
Tool	ø0.8mm Ball EM	
Spindle speed	24000 r/min	
Feed rate	400 mm/min (15.7 ipm)	

#### Hinge Fitting

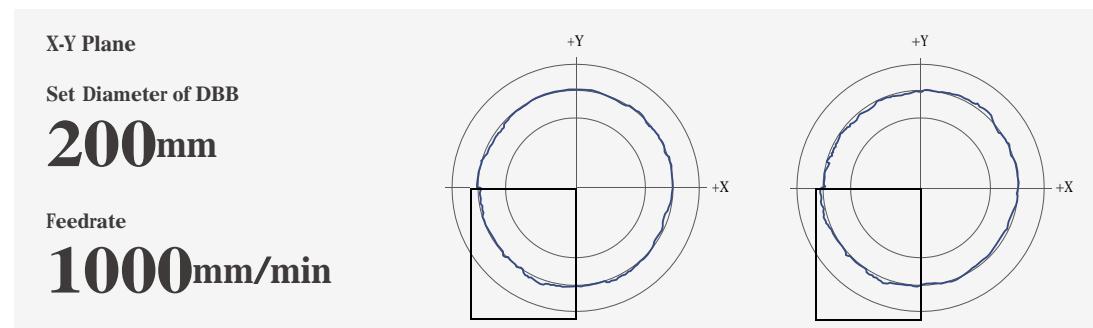
Workpiece size	270 x 138 x 90 mm (10.6 x 5.4 x 3.5 inch)	
Material	AL7075	
Mold Package	DSQ 1	
Cutting	Finish	
Tool	ø12 mm Ball EM	
Spindle speed	12000 r/min	
Feed rate	1000 mm/min (39.4 ipm)	

#### Impeller

Workpiece size	D290 x 153 mm (D11.4 x 6 inch)	
Material	AL7075	
Mold Package	DSQ 3	
Cutting	Finish	
Tool	ø8 mm Ball EM	
Spindle speed	12000 r/min	
Feed rate	2500 mm/min (98.4 ipm)	

### Ball Bar Measurement Test

Higher roundness accuracy is realized by the advanced design of machine structure and Doosan control system.





## Standard / Optional Specifications

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## Customer Support Service

Diverse optional features are available to meet specific customer requirements.

Standard    Optional    X N/A

NO.	Description	Features	VC 630/5AX
1	Air blower		---
2	Air gun		---
3		40 Tools	---
4		60 Tools	---
5	Automatic tool changer	80 Tools	---
6		101 Tools	---
7		121 Tools	---
8	Automatic Tool Length Measurement	TS27R : RENISHAW	---
9	Chip conveyor	Hinge / Scraper / Drum filter type	---
10	Coolant gun		---
11	Coolant tank		---
12	DSQ	DSQ1 (AICC II_200 block)	---
13	(high speed / high precision contour control)	DSQ2 (DSQ1 & Data server 1GB)	---
14		DSQ3 (DSQ2 & 600 block)	---
15		DSQ4 (DSQ3 & 1000 block)	---
16		Tool management system	---
17	Easy Operation Package (E.O.P)	Alarm / M-code / G-code / ATC restoration guidance	---
18		Table movement / Guidance on work coordinate system setup	---
19	Electric cabinet air conditioner		---
20	Electric cabinet light		---
21	Electric cabinet line filter		---
22		X Axis	---
23	Linear scale	Y Axis	---
24		Z Axis	---
25	MPG	1 MPG_PORTABLE TYPE	---
26		1 MPG_PORTABLE_W/ENABLE TYPE	---
27		DOOSAN FANUC i	---
28		FANUC 31i-5	---
29	NC system	HEIDENHAIN iTNC 530	---
30		SIEMENS S840Dsl	---
31		10.4 inch (Color)_DOOSAN FANUC i	---
32	NC system lcd size	15.0 inch (Color)_FANUC	---
33		15.0 inch (Color)_HEIDENHAIN	---
34		15.0 inch (Color)_SIEMENS	---
35	Oil Skimmer	Belt Type	---
36	Power transformer		---
37	Shower coolant		---
38		22/18.5 kW (29.5/24.8 Hp) : FANUC (12000, 20000 r/min)	---
39		23.5/18 kW (31.5/24.2 Hp) : HEIDENHAIN (12000 r/min)	---
40	Spindle motor power	28/24 kW (37.6/32.2 Hp) : HEIDENHAIN (20000 r/min)	---
41		30/24 kW (40.3/32.2 Hp) : SIEMENS (12000 r/min)	---
42	Spindle speed	12000 r/min	---
43		20000 r/min	---
44	Test bar		---
45		NONE	---
46	Through spindle coolant	1.5 KW_2.0 MPA	---
47		4.0 KW_2.0 MPA	---
48		5.5 KW_7.0 MPA_DUAL BAG FILTER	---
49	Work & tool counter	WORK / TOOL	---

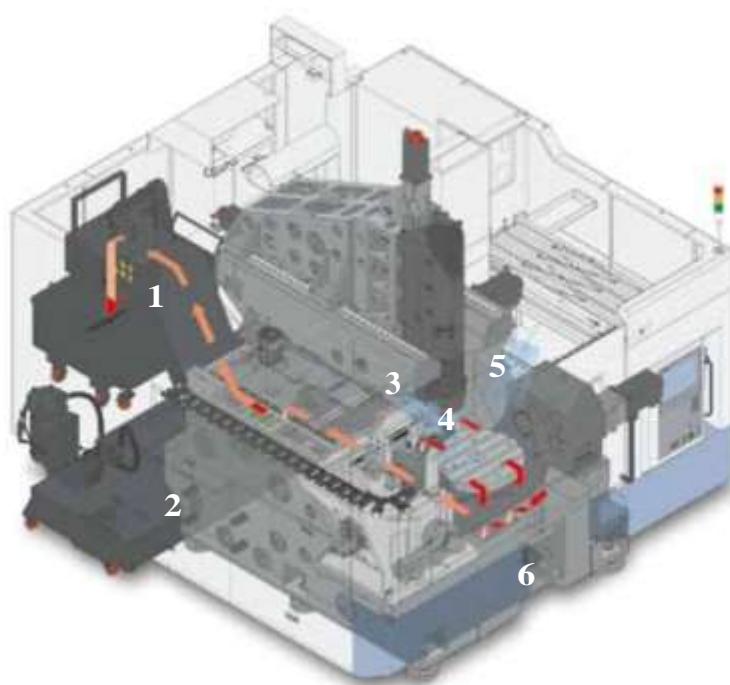
\* More options will require consultation with Doosan.

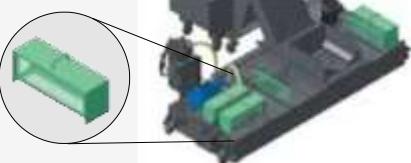
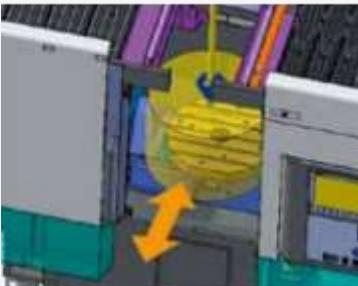


## Optional Equipments

### Convenience

Various optional equipments maximize the convenience and productivity.



<b>1.</b> Chip conveyor <small>option</small>	<b>2.</b> Large capacity coolant tank built-in with chip pan and box filter <small>Coolant tank capacity 360L</small>
 Hinge type      Scraper type      Drum filter type	 Easier chip disposal with box-type filter
<b>3.</b> Shower coolant <small>option</small>	<b>4.</b> Coolant system
	
<b>5.</b> Auto-door type top cover <small>The top cover helps enhancing convenience when loading/unloading heavy workpiece on the processing table.</small>	<b>6.</b> Internal screw conveyor
	



## Convenient Operation

User convenience has been significantly enhanced with panel.

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## FANUC 31i-5

### User-Friendly Operation Panel

Large 15inch screen and user-friendly operating function ensure convenient and efficient operation.



Large 15inch screen display

Design optimized for customers' needs based on extensive know-how

<b>Designed for user convenience</b>	Convenient and intuitive UI Optimized button size High-visibility lamps Long lifecycle buttons Partitioned to prevent operator error
<b>Convenient option buttons</b>	Detachable buttons Spare I/O signal ports for optional devices
<b>Customized functionality</b>	Customer-specific function switches Available for auxiliary panel design

## Easy Operation Package

Setting up of tools, work pieces and programs, as well as troubleshooting for abnormal condition of main parts, is designed to minimize waiting time, maximize operational efficiency, and enhance operator convenience.



### Adaptive Feed Control (AFC)

Function to control feedrate so that the cutting can be carried out at a constant load  
(To adapt to the spindle load set up with constant load feedrate control function)



### Tool Management

Function to manage tool information  
[Tool information]  
- Tool No.  
- Tool condition : normal, large diameter, worn/damaged, used for the first time, manual  
- Tool name



### Tool Load Monitor

Function to automatically monitor tool load  
(Different loads can be set for one tool according to M700 ~ M704)



### Pattern Cycle

(Engraving function : option)  
Function to create frequently used cutting programs automatically  
- Pattern Cycle: creates a program for a pre-defined shape  
- Engraving: creates a program for cutting a shape described with characters (option)



### Work Offset Setting

Function to configure various work offset settings



### Alarm Guidance

Function to show detailed info on frequently triggered alarms and recommended actions



### Sensor Status Monitor

Function to view sensor conditions of the machine



### ATC Recovery

Function to view detailed info with recommended actions and to perform step-by-step operation manually  
(when an alarm is triggered during an ATC operation)

## HEIDENHAIN iTNC530

### Superior Hardware Specifications

15" LCD and capacious 21GB memory

15" LCD

15 inch

Description	HEIDENHAIN iTNC530	Remarks
Screen size	15" STD	-
Storage memory	21GB STD	-
Interference prevention system	Optional	-
Kinematic OPT.	Optional	Measuring device not included
Look-ahead block	1024 blocks	-
3D line graphics	Std.	-

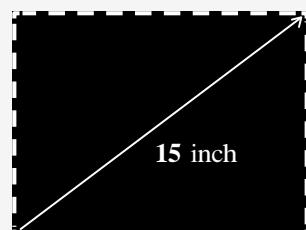
## SIEMENS 840Dsl

### Providing a perfect 5-axis machining environment

15-inch LCD and SINUMERIK Mdynamics 5-axis machining package (standard)



Large 15inch screen display



Mdynamics  
5-axis machining  
package

### Main features

- Advanced Surface
- HMI user memory on CF-Card (min. 1GB program memory)
- Automatic Measuring cycles functions
- 3D simulation functions
- Real-time simulation functions
- ShopMill (an interactive machining support function)

## Spindle

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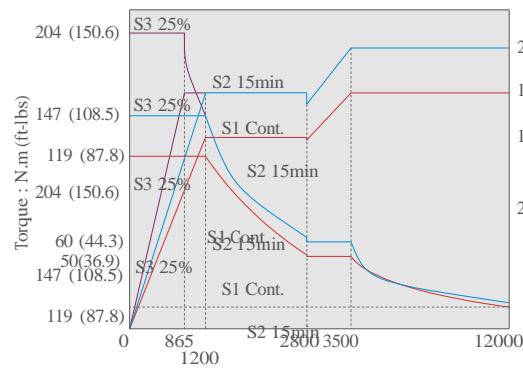
Customer Support  
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## Spindle Power – Torque Curve

FANUC 3i-5

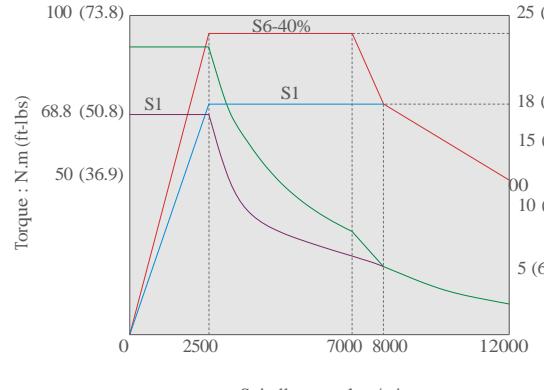
Max. spindle speed  
- 12000 r/min  
- 20000 r/min **option**

Spindle motor power (30min/cont.)  
- 22/18.5 kW (29.5/24.8 Hp)  
- 12000 & 20000 r/min common

HEIDENHAIN iTNC530 **option**

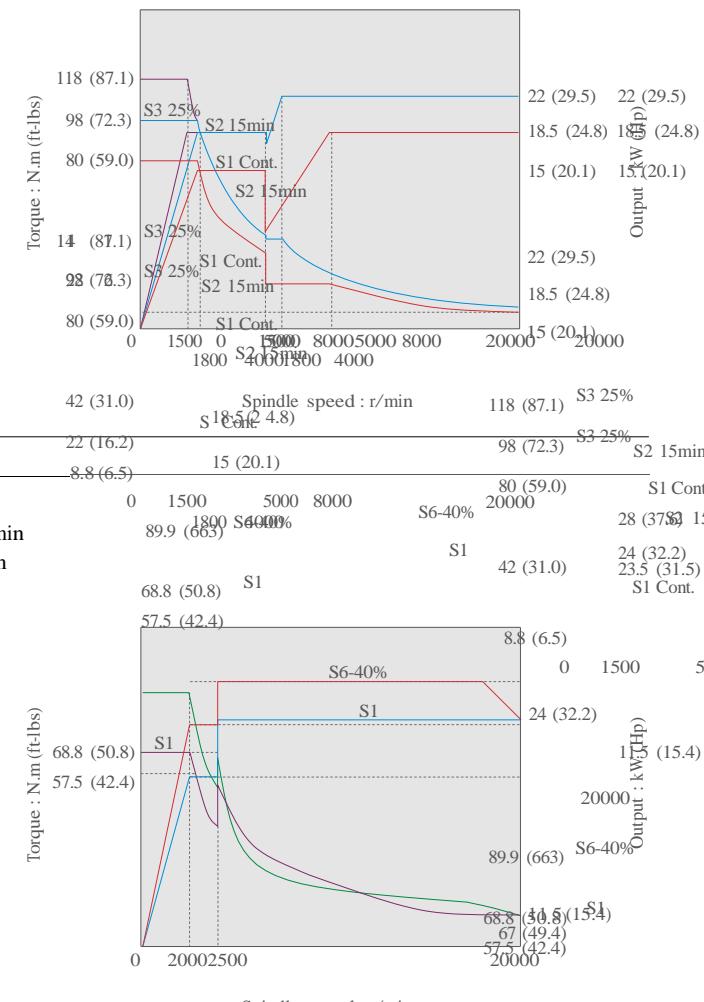
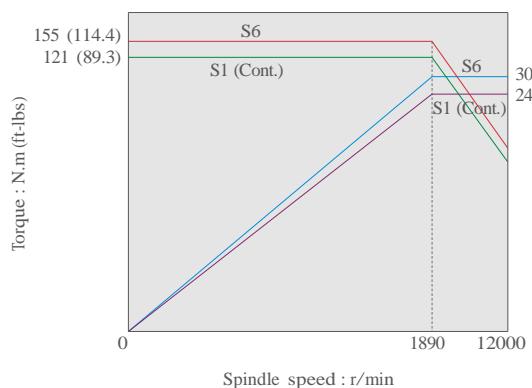
Max. spindle speed  
- 12000 r/min  
- 20000 r/min **option**

Spindle motor power (30min/cont.)  
- 23.5/18 kW (31.5/24.2 Hp) : 12000 r/min  
- 28/24 kW (37.6/32.2 Hp) : 20000 r/min

SIEMENS 840Dsl **option**

Max. spindle speed : 12000 r/min

Spindle motor power(30min/cont.)  
- 30/24 kW (40.3/32.2 Hp)

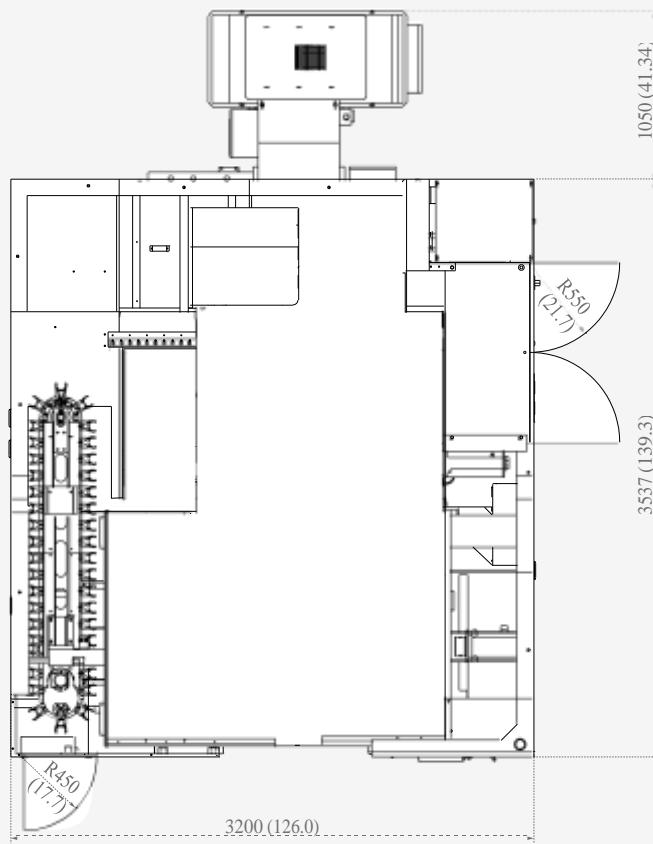


## External Dimensions

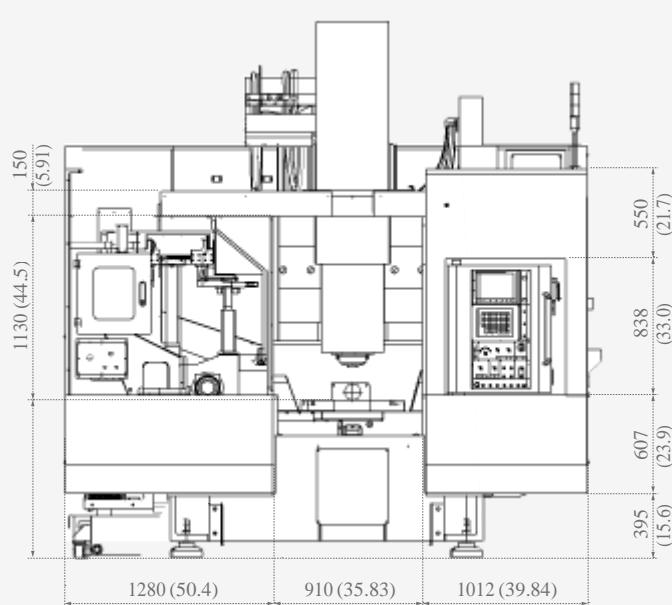
### VC 630/5AX (Standard type)

Unit : mm (inch)

Top view



Front view

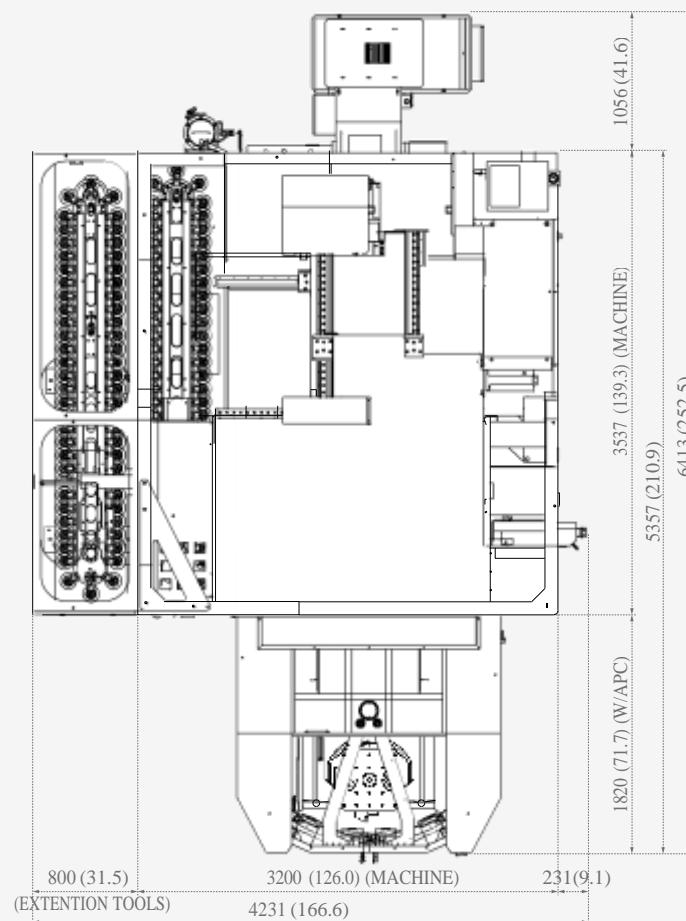


## External Dimensions

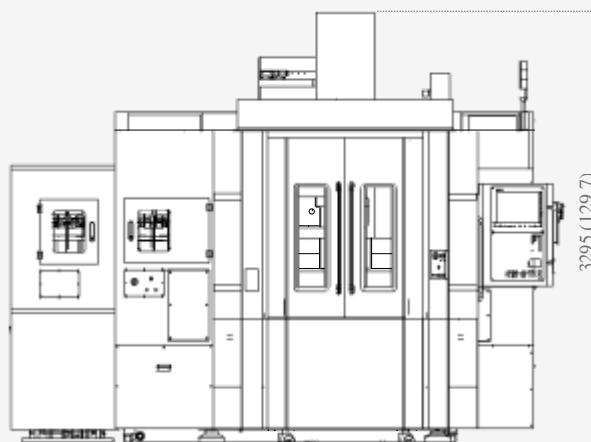
## VC 630/5AX (APC type)

Unit : mm (inch)

Top view



Front view



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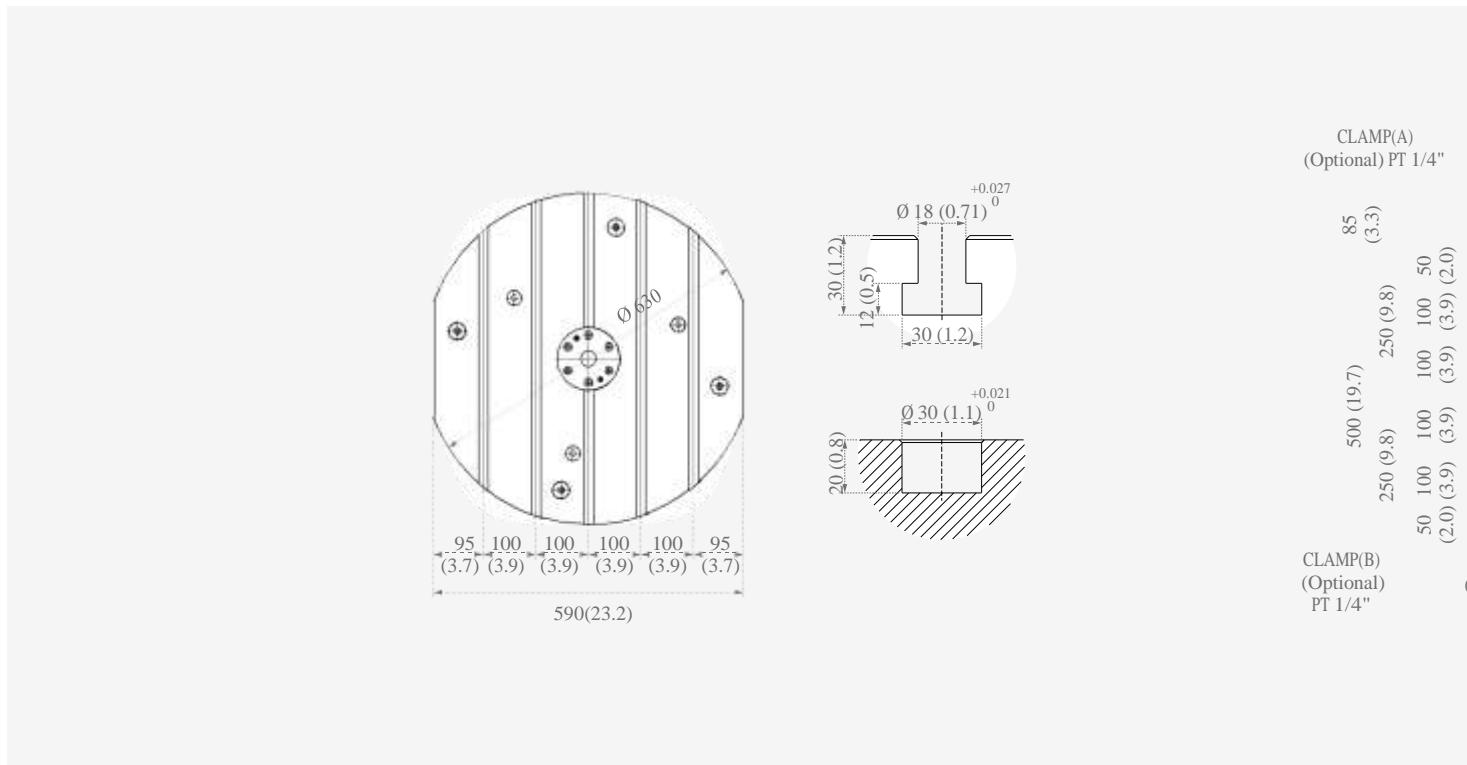
Service

## Table dimension / Tool shank

### Table dimension

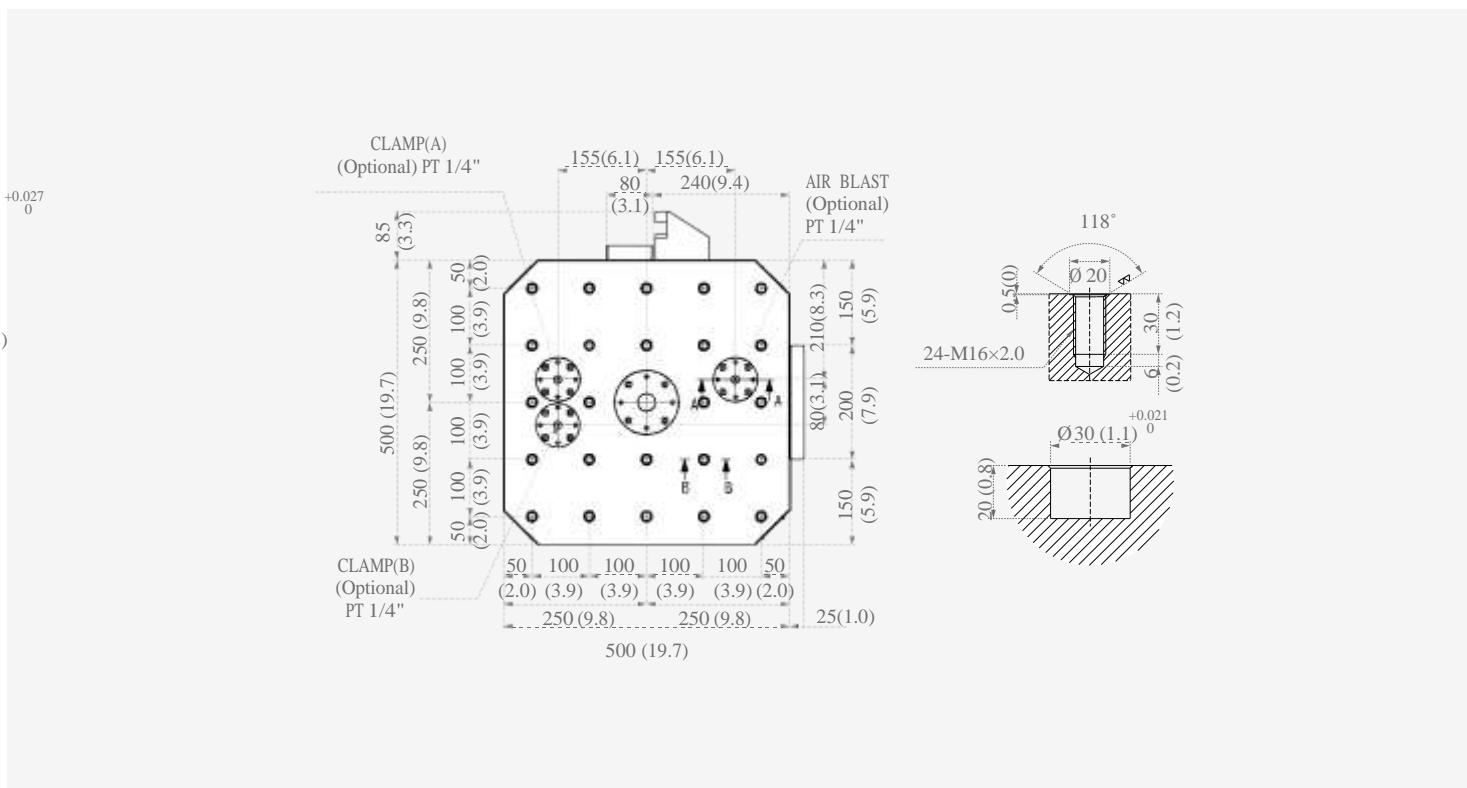
Standard type

Unit : mm (inch)



APC type

Unit : mm (inch)



### Table dimension / Tool shank

## Tool shank

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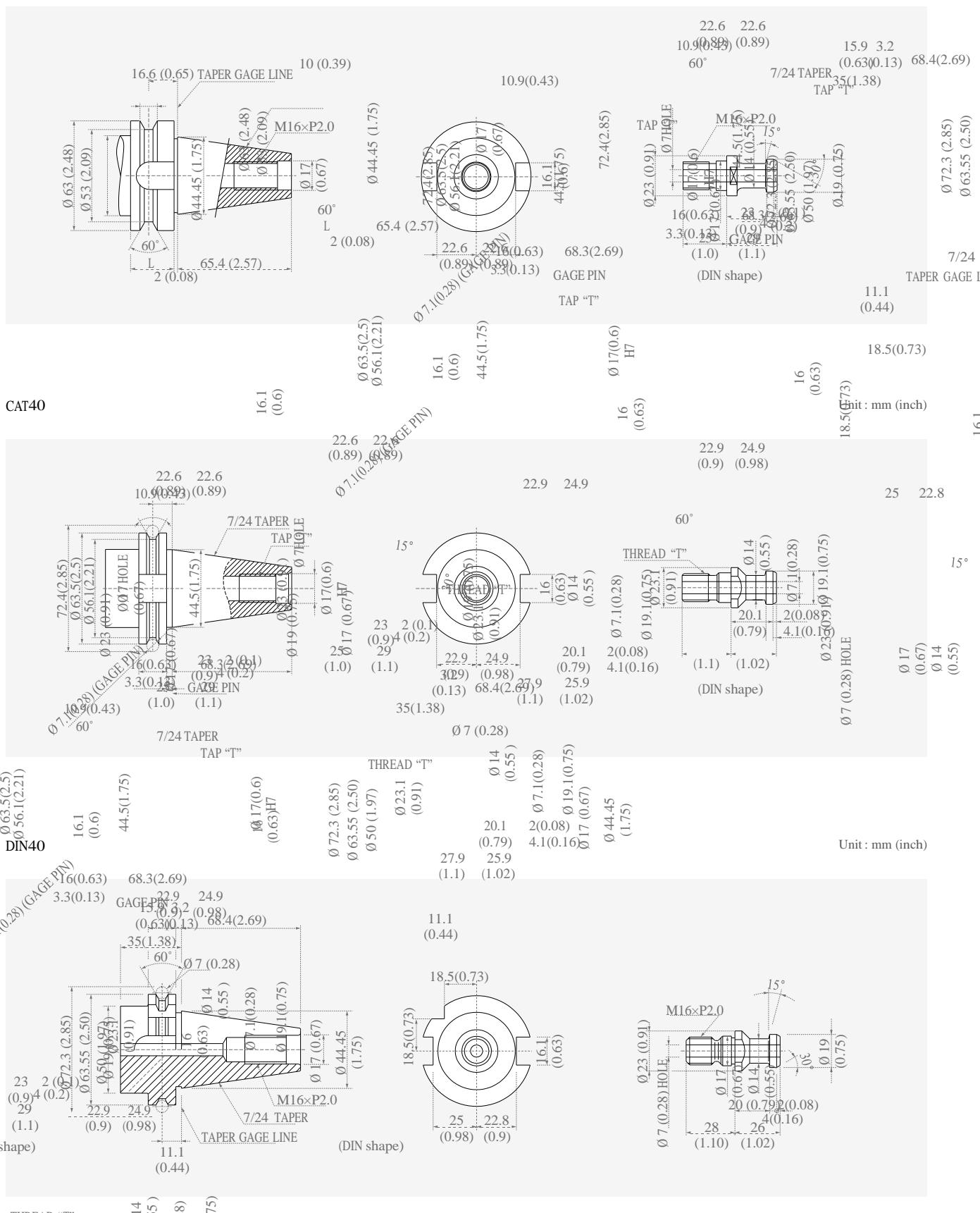
## Specifications

## Customer Support Service

BT40

16.1 (0.6) Unit : mm (inch)

Unit: mm (inch)



## Machine Specifications



Description		Unit	VC 630/5AX	VC 630/5AX with APC
Travels	X-axis	mm (inch)	650 (25.6)	
	Y-axis	mm (inch)	765 (30.1)	
	Z-axis	mm (inch)	520 (20.5)	
	A-axis	deg.	150 (+30~ -120)	
	C-axis	deg.	360	
	Distance from spindle nose to table top	mm (inch)	210 ~ 730 (8.3~28.7)	160 ~ 680 (6.3~26.8)
	Distance from spindle center to column guideway	mm (inch)		220 (8.7)
Feedrate	Rapid traverse rate (X / Y / Z)	m/min (ipm)	40 / 40 / 36 (1574.8 / 1574.8 / 1417.3)	
	Rapid traverse rate (A / C)	r/min		20 / 30
	Cutting feedrate (X / Y / Z)	mm/min (ipm)		18000 (708.7)
	Cutting feedrate (A / C)	deg/min		7200
Table	Table size	mm (inch)	ø 630 (24.8)	500 x 500 (19.7 x 19.7)
	Table loading capacity	kg (lb)		500 (1102.3)
	Max. workpiece swing diameter x height	mm (inch)	ø 730 x 500 (28.7 x 19.7)	ø 730 x 450 (28.7 x 17.7)
	Minimum table indexing angle	-		0.001
Spindle	Max. spindle speed	r/min		12000 (20000)
	Spindle taper	-		ISO#40 7 / 24 Taper
	Max. spindle torque	N.m(ft-lb)		204 (150.6) (25% ED)
Automatic tool changer	Type of tool shank	-		MAS403 BT40
	Tool storage capacity	ea		40 {60 / 81 / 101 / 121}
	Max. tool diameter	mm (inch)		ø 80 (59.0)
	Max. tool diameter without adjacent tools	mm (inch)		ø 125 (92.3)
	Max. tool length	mm (inch)		300 (221.4)
	Max. tool weight	kg (lb)		8 (17.6)
	Method of tool selection	-		Fixed address
	Tool change time (tool-to-tool)	s		1.0
Automatic pallet changer	Tool change time (chip-to-chip)	s		8.5
	Number of pallet	ea	-	2
	Type	-	-	Rotary shuttle
Motor	Pallet change time	s	-	30
	Spindle motor power	kW (Hp)	FANUC 31i-5 : 22/18.5 (29.5/24.8 Hp) {HEIDENHAIN iTNC 530 : 23.5/18(31.5/24.2 Hp), 12000 r/min / 28/24(37.6/32.2 Hp) : 20000 r/min} {SIEMENS 840 Dsl : 30/24(40.3/32.2 Hp)}	
Power source	Electric power supply	kVA	53.3	
	Compressed air supply	MPa	0.54	
Tank capacity	Coolant tank capacity	L (galon)	360 (95.1)	
	Lubrication tank capacity	L (galon)	1.32 (0.4)	
Machine Dimensions	Machine dimension (L x W x H)	mm (inch)	3537(4587 : with chip conveyor ) x 3200 x 3295 (139.3(180.6 : with chip conveyor) x 126 x 129.7)	5357(with chip conveyor : 6413) x 4231 x 3295 (210.9(with chip conveyor : 252.5) x 166.6 x 129.7)
	Machine weight	kg (lb)	12500 (27557.4)	16000 (35273.4)
NC System			FANUC 31i-5 {DOOSAN FANUC i / HEIDENHAIN iTNC 530 / SIEMENS 840 Dsl}	

\* { } : Option

## NC Unit Specifications

Standard  Optional  X N/A

## FANUC

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## Customer Support Service

NO.	Description		Spec.	DOOSAN-FANUC i	FANUC 31i-5
1	AXES CONTROL	Controlled axes	3 (X, Y, Z)	X, Y, Z, B, (5)	X, Y, Z, B, (5)
2		Additional controlled axes	5 axes in total		
3		Least command increment	0.001 mm / 0.0001"		
4		Least input increment	0.001 mm / 0.0001"		
5		Interpolation type pitch error compensation			
6	INTERPOLATION & FEED FUNCTION	2nd reference point return	G30		
7		3rd / 4th reference return			
8		Inverse time feed			
9		Cylindrical interpolation	G07.1		
10		Helical interpolation B	Only Fanuc 30i	-	
11		Smooth interpolation		-	
12		NURBS interpolation		-	
13		Involute interpolation		-	
14		Helical involute interpolation		-	
15		Bell-type acceleration/deceleration before look ahead interpolation			
16		Smooth backlash compensation			
17		Automatic corner override	G62		
18		Manual handle feed	Max. 3unit	1 unit	1 unit
19		Manual handle feed rate	x1, x10, x100 (per pulse)		
20		Handle interruption			
21		Manual handle retrace			
22		Manual handle feed 2/3 unit		-	
23		Nano smoothing	AI contour control II is required.		
24		AI APC	20 BLOCK	X	X
25		AICC I	30 BLOCK	X	X
26		AICC I	40 BLOCK	X	X
27		AICC II	200 BLOCK		
28		AICC II	400 BLOCK	-	
29		High-speed processing	600 BLOCK	-	
30		Look-ahead blocks expansion	1000 BLOCK	-	
31		DSQ I	AICC II (200block) + Machining condition selection function	-	
32		DSQ II	AICC II (200block) + Machining condition selection function + Data server (1GB)	-	
33		DSQ III	AICC II with high speed processing (600block) + Machining condition selection function + Data server(1GB)	-	
34	SPINDLE & M-CODE FUNCTION	M- code function			
35		Retraction for rigid tapping			
36		Rigid tapping	G84, G74		
37	TOOL FUNCTION	Number of tool offsets	64 ea	-	64 ea
38		Number of tool offsets	99 ea	-	
39		Number of tool offsets	200 ea	-	
40		Number of tool offsets	400 ea	400 ea	
41		Number of tool offsets	499 / 999 / 2000 ea	-	
42		Tool nose radius compensation	G40, G41, G42		
43		Tool length compensation	G43, G44, G49		
44		Tool life management			
45		Addition of tool pairs for tool life management			
46		Tool offset	G45 - G48		

## NC Unit Specifications

### FANUC

NO.	Description	Spec.	DOOSAN-FANUC i	FANUC 31i-5
47	PROGRAMMING & EDITING FUNCTION	Custom macro		
48		Macro executor		
49		Extended part program editing		
50		Part program storage	256KB (640m)	- 640m
51		Part program storage	512KB (1,280m)	1280m
52		Part program storage	1MB (2,560m)	-
53		Part program storage	2MB (5,120m)	
54		Part program storage	4MB (1,0240m)	-
55		Part program storage	8MB (2,0480m)	-
56		Inch/metric conversion	G20 / G21	
57		Number of Registered programs	400 ea	400 ea -
58		Number of Registered programs	500 ea	- 500 ea
59		Number of Registered programs	1000 ea	-
60		Number of Registered programs	4000 ea	-
61		Optional block skip	9 BLOCK	
62		Optional stop	M01	
63		Program file name	32 characters	-
64		Program number	04-digits	-
65		Playback function		
66	OTHERS FUNCTIONS (Operation, setting & Display, etc)	Addition of workpiece coordinate system	G54.1 P1 - 48 (48 pairs)	48 pairs 48 pairs
67		Addition of workpiece coordinate system	G54.1 P1 - 300 (300 pairs)	-
68	OTHERS FUNCTIONS (Operation, setting & Display, etc)	Embedded Ethernet		
69		Graphic display	Tool path drawing	
70		Loadmeter display		
71		Memory card interface		
72		USB memory interface	Only Data Read & Write	
73		Operation history display		
74		DNC operation with memory card		
75		Optional angle chamfering / corner R		
76		Run hour and part number display		
77		High speed skip function		
78		Polar coordinate command	G15 / G16	
79		Polar coordinate interpolation	G12.1 / G13.1	-
80		Programmable mirror image	G50.1 / G51.1	
81		Scaling	G50, G51	
82		Single direction positioning	G60	
83		Pattern data input		
84		Jerk control	AI contour control II is required.	
85		Fast Data server with 1GB PCMCIA card		
86		Fast Ethernet		
87		3-dimensional coordinate conversion		
88		3-dimensional tool compensation		-
89		Figure copying	G72.1, G72.2	-
90		Machining time stamp function		-
91	OTHERS FUNCTIONS (Operation, setting & Display, etc)	EZ Guide I with 10.4" Color TFT	Doosan Infracore Conversational Programming Solution - When the EZ Guide i is used, the Dynamic graphic display cannot application	
92		Dynamic graphic display (with 10.4" Color TFT LCD)	- Machining profile drawing. - When the EZ Guide i is used, the Dynamic graphic display cannot application	

## NC Unit Specifications

HEIDENHAIN

## Basic Information

Basic Structure  
Cutting  
Performance

## Detailed Information

Options  
Capacity Diagram  
Specifications

## Customer Support Service

No.	Description		Spec.	iTNC 530
1	Axes	Controlled axes	5 axes	X, Y, Z, C, A
2			Max. 18 axes in total	---
3		Least command increment	0.0001 mm (0.0001 inch), 0.0001°	---
4		Least input increment	0.0001 mm (0.0001 inch), 0.0001°	---
5		Maximum commandable value	±99999.999mm (±3937 inch)	---
6		Axis feedback control	Double-speed control loops for high-frequency spindles and torque/linear motors	---
7		MDI / DISPLAY unit	15.1 inch TFT color flat panel	---
8			19 inch TFT color flat panel	---
9		Program memory for NC programs	SSDR	21GB
10		Block processing time		0.5 ms
11		Cycle time for path interpolation	CC 61xx	3 ms
12		Encoders	Absolute encoders	EnDat 2.2
13	Commissioning and diagnostics	Data interfaces	Ethernet interface	---
14			USB interface (USB 2.0)	---
15		Look-ahead	Intelligent path control by calculating the path speed ahead of time (max. 1024 blocks.)	---
16		Machine functions	HSC filters	---
17			Switching the traverse ranges	---
18			Program input	According to ISO
19				With smarT.NC
20	Position entry		Nominal positions for lines and arcs in Cartesian coordinates	---
21			Incremental or absolute dimensions	---
22			Display and entry in mm or inches	---
23			Display of the handwheel path during machining with handwheel superimposition	---
24			Paraxial positioning blocks	---
25	Tool compensation		In the working plane and tool length	---
26			Radius-compensated contour lookahead for up to 99 blocks (M120)	---
27			Three-dimensional tool radius compensation	---
28	Tool table		Central storage of tool data	---
29			Multiple tool tables with any number of tools	---
30	User functions	Cutting-data table	Calculation of spindle speed and feed rate based on stored tables	---
31		Constant contouring speed	relative to the path of the tool center or to the tool's cutting edge	---
32		Parallel operation	Creation of a program while another program is being run	---
33	34	Tilting the working plane with Cycle 19		---
34		Tilting the working plane with the PLANE function		---
35		Manual traverse in tool-axis direction	after interruption of program run	---
36		Function TCPM	Retaining the position of tool tip when positioning tilting axes	---
37		Rotary table machining	Programming of cylindrical contours as if in two axes	---
38			Feed rate in distance per minute	---
39		FK free contour programming	for workpieces not dimensioned for NC programming	---
40	Program jumps		Subprograms and program section repeats	---
41			Calling any program as a subprogram	---
42		Program verification graphics	Plan view, view in three planes, 3-D view	---
43	Programming graphics	3-D line graphics		---
44		Program-run graphics	(plan view, view in three planes, 3-D view)	---

Standard Optional X N/A

## HEIDENHAIN

No.	Description	Spec.	iTNC 530
45	Datum tables	Saving of workpiece-specific datums	
46	Preset table	Saving of reference points	
47	Freely definable table	after interruption of program run	
48	Returning to the contour	With mid-program startup	
49		After program interruption (with the GOTO key)	
50	Autostart		
51	Actual position capture		
52	Enhanced file management		
53	Context-sensitive help for error messages		
54	TNCguide	Browser-based, context-sensitive help system	
55	Calculator		
56	Entry of text and special characters		
57	Comment blocks in NC program		
58	"Save As" function		
59	Structure blocks in NC program		
60	Entry of feed rates	FU (feed per revolution)	
61		FZ (tooth feed per revolution)	
62		FT (time in seconds for path)	
63		FMAXT (only for rapid traverse pot: time in seconds for path)	
64	Dynamic collision monitoring (DCM)		
65	Fixture monitoring		
66	Processing DXF data		
67	Global program settings (GS)		
68	Adaptive feed control (AFC)		
69	KinematicsOpt	Automatic measurement and optimization of machine kinematics	
70	KinematicsComp	Three-dimensional compensation	
71	3D-ToolComp	Dynamic 3-D tool radius compensation	
72	Fixed cycles	Working plane	
73		Cylinder surface	
74		Cylinder surface slot milling	
75		Cylinder surface ridge milling	
76	Cycles for automatic workpiece inspection	Calibrate TS	
77		Calibrate TS length	
78		Measure axis shift	
79		Save kinematics	
80		Measure kinematics	
81		Preset compensation	
82	Options	Software option 1	
83		- Rotary table machining	Programming of cylindrical contours as if in two axes
84			Feed rate in mm/min
85		- Coordinate transformation	Tilting the working plane, PLANE function
86		- Interpolation	Circular in 3 axes with tilted working plane
87		Software option 2	
88		- 3-D machining	3-D tool compensation through surface normal vectors
89			Tool center point management (TCPM)
90			Keeping the tool normal to the contour
91			Tool radius compensation normal to the tool direction
92			Line in 5 axes (subject to export permit)
93			Spline: execution of splines (3rd degree polynomial)

## NC Unit Specifications

SIEMENS

## Basic Information

Basic Structure  
Cutting  
Performance

## Detailed Information

Options  
Capacity Diagram  
Specifications

## Customer Support Service

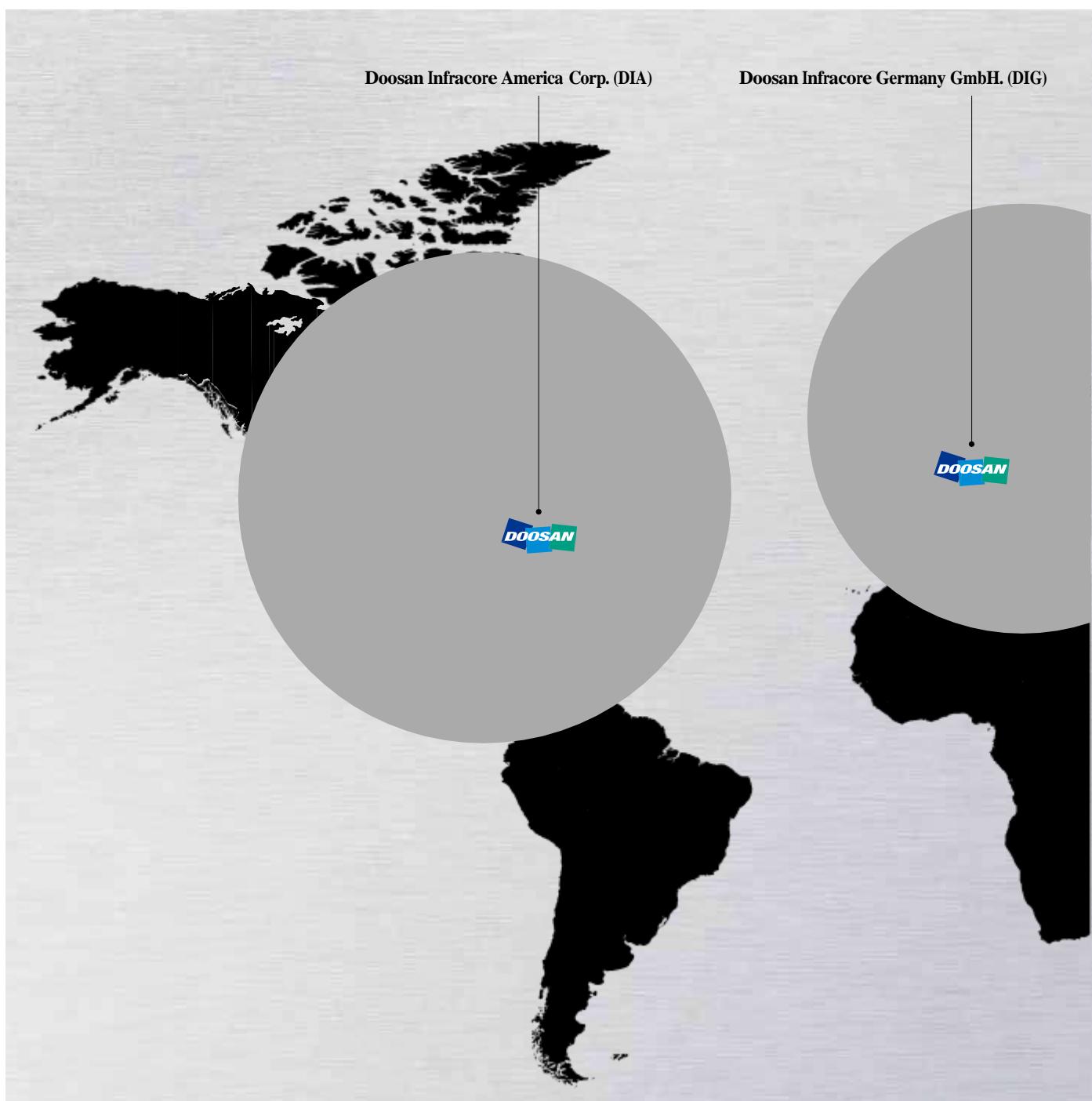
NO.	Description		Spec.	S840DSL
1	AXES CONTROL	Controlled axes	3 axes	X
2			4 axes	X
3			5 axes	X, Y, Z, C, A
4		Simultaneously controlled axes	Positioning(G00)/Linear interpolation(G01) : 3 axes Circular interpolation(G02, G03) : 2 axes	X
5			Positioning(G00)/Linear interpolation(G01) : 4 axes Circular interpolation(G02, G03) : 2 axes	X
6			Least command increment	0.001mm (0.0001 inch)
7			Least input increment	0.001mm (0.0001 inch)
8			Maximum commandable value	±99999.999mm (±3937 inch)
9	INTERPOLATION & FEED	Reference point return		
10		Inverse time feedrate	G93	
11		Spline interpolation (A, B and C splines)		
12		SPINDLE FUNCTIONS	Retraction for rigid tapping	
13			Rigid tapping	
14		Tool radius compensations in plane		
15		• With approach and retract strategies		
16		• With transition circle / ellipse on outer edges		
17		TOOL FUNCTIONS	Number of tools / cutting edges in tool list	256 / 512
18			Tool length compensation	
19			Tool offset selection via T and D numbers	
20			Replacement tools for tool management	
21			Monitoring of tool life and workpiece count	
22	PROGRAMMING & EDITING FUNCTIONS	Main program call from main program and subroutine		
23		Subroutine levels and interrupt routines, max.		16 / 2
24		Number of subroutine passes <= 9999		
25		Number of levels for skip blocks 1		
26		Number of levels for skip blocks 8		
27		Polar coordinates		
28		Auxiliary function output		
29		• Via M word, max. programmable value range: INT 231-1		
30		• Via H word, max. range: REAL ± 3.4028 ex 38/INT -231 ... 231-1		
31		High-level CNC language with		
32		• User variables, configurable		
33		• Read/write system variables		
34		• Indirect programming		
35		• Program jumps and branches		
36		• Arithmetic and trigonometric functions		
37		• Compare operations and logic combinations		
38		• Macro techniques		
39		• Control structures IF-ELSE-ENDIF		
40		• Control structures WHILE, FOR, REPEAT, LOOP		
41		• STRING functions		
42		Program functions		
43		• Dynamic preprocessing memory FIFO		
44		• Look ahead number of blocks		150
45		• Frame concept		
46		• Inclined-surface machining with swivel cycle		
47		Online ISO dialect interpreter		

Standard Optional X N/A

## SIEMENS

NO.	Description	Spec.	S840Dsl
48	<b>PROGRAMMING &amp; EDITING FUNCTIONS</b>	<b>Program / workpiece management</b>	
49		• Parts programs on NCU, max. number	1000
50		• Workpieces on NCU, max. number	250
51		• On additional plug-in CF card	
52		• On USB storage medium (e.g. disk drive, USB stick)	
53		• On network drive	
54		Basic frames, max. number	16
55		Settable offsets, max. number	100
56		<b>Program editor</b>	
57		• Programming support for cycles program (Program Guide)	
58		• CNC editor with editing functions: Marking, copying, deleting	
59		• Programming graphics / free contour input (contour calculator)	
60		Technology cycles for drilling / milling	
61		Pocket milling free contour and islands stock removal cycle	
62		Residual material detection	
63		Access protection for cycles	
64		Programming support can be extended, e.g. customer cycles	
65		2D simulation	
66		3D simulation, finished part	
67		Simultaneous recording	
68	<b>OTHERS FUNCTIONS (Operation, setting &amp; Display, etc)</b>	<b>JOG</b>	
69		• Handwheel selection	
70		• Switchover: inch / metric	
71		<b>Automatic</b>	
72		• Execution from USB or CF card interface on operator panel front	
73		• Execution from network drive	
74		• DRF offset	
75		• Block search with / without calculation	
76		<b>Preset</b>	
77		• Set actual value	
78		10.4" color display	X
79		15.0" color display	
80		Plain text display of user variables	
81		<b>Operating software languages</b>	
82		• Ch_S, Ch_T, En, Fr, Gr, It, Kr, Pt, Sp	
83		• Additional languages, use of language extensions	
84		Working area limitation	
85		Limit switch monitoring	
86		Software and hardware limit switches	
87		<b>Remote Control System (RCS) remote diagnostics</b>	
88		• RCS Host remote diagnostics function	
89		• RCS Commander (viewer function)	
90		Integrated service planner for the monitoring of service intervals	
91		Automatic measuring cycles	
92		Easy Extend	X
93		TRANSMIT / cylinder surface transformation	
94		Contour handwheel	
95		Integrate screens in SINUMERIK Operate with SINUMERIK Integrate Run MyScreens	
96		Cross-mode actions (ASUPs and synchronized actions in all operating modes)	

# Responding to Customers Anytime, Anywhere



## Global Service Support Network

Corporations

5

Dealer Networks

128

Technical Centers

21

Factories

3

Technical Center: Sales Support, Service Support, Parts Support

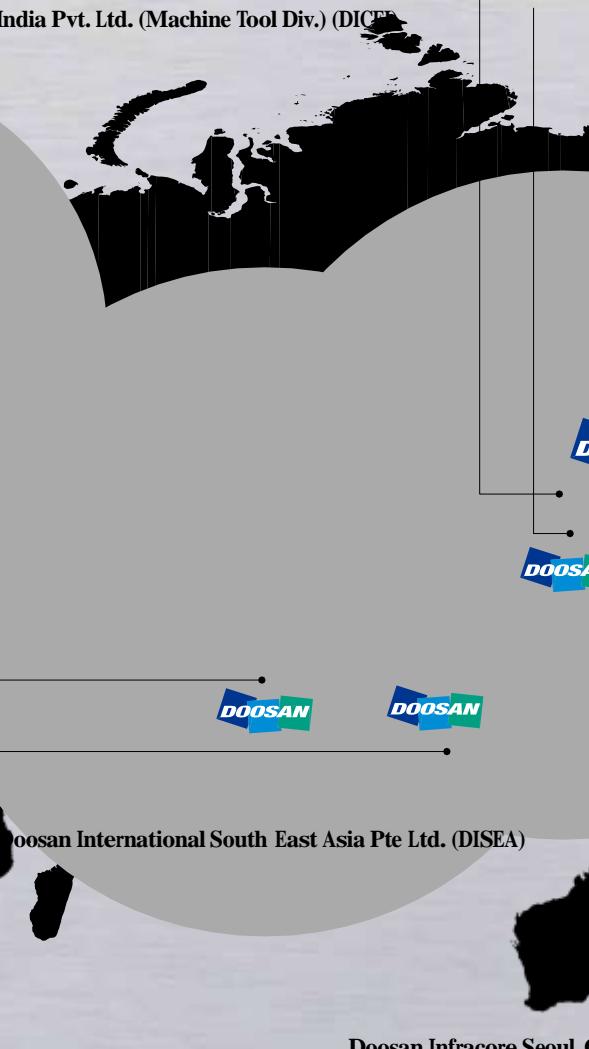
## Doosan Machine Tools' Global Network, Responding to Customer's Needs nearby, Anytime, Anywhere

Doosan machine tools provides a system-based professional support service before and after the machine tool sale by responding quickly and efficiently to customers' demands. By supplying spare parts, product training, field service and technical support, we can provide top class support to our customers around the world.

Doosan Infracore Yantai Factory (DIY)

Doosan Infracore Construction Equipment  
India Pvt. Ltd. (Machine Tool Div.) (DICE)

DIY Shanghai Office



### Customer Support Service

We help customers to achieve success by providing a variety of professional services from pre-sales consultancy to post-sales support.

#### Supplying Parts



- Supplying a wide range of original Doosan spare parts
- Parts repair service

#### Field Services



- On site service
- Machine installation and testing
- Scheduled preventive maintenance
- Machine repair

#### Technical Support



- Supports machining methods and technology
- Responds to technical queries
- Provides technical consultancy

### Domestic Service Support Network

Integrated  
Support  
Centers

2

Sales Branch  
Offices

7

Post-Sales  
Service  
Centers

6

Designated  
Repair  
Service  
Centers

31

#### Training



- Programming / machine setup and operation
- Electrical and mechanical maintenance
- Applications engineering

## Major Specifications

### VC 630/5AX



Specification	UNIT	VC 630/5AX	VC 630/5AX with APC
Max. spindle speed	r/min	12000	
Spindle motor power	kW (Hp)	FANUC : 22 / 18.5 (29.5 / 24.8)	
Tool shank	Taper	ISO#40 7/24	
Travels (X, Y, Z)	mm (inch)	650 / 765 / 520 (25.6 / 30.1 / 20.5 )	
Number of tools	ea	40	
Table size	mm (inch)	Ø630 (Ø23.6)	500 x 500 (19.7 x 19.7 )
Travels (A, C)	deg	A-axis : 150 , C-axis : 360	
NC system	-	FANUC 3i-5	



## Doosan Machine Tools

<http://www.doosanmachinetools.com>

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■ The specifications and information above-mentioned may be changed without prior notice.